DOCUMENT RESUME

ED 428 263 CE 078 298

AUTHOR Moore, David Thornton
TITLE Toward a Theory of Work-Based Learning. IEE Brief Number 23.
INSTITUTION Columbia Univ., New York, NY. Inst. on Education and the Economy.
SPONS AGENCY Pew Charitable Trusts, Philadelphia, PA.; DeWitt Wallace/Reader's Digest Fund, Pleasantville, NY.
ISSN ISSN-1059-2776
PUB DATE 1999-01-00
NOTE 7p.
PUB TYPE Reports - Research (143)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cognitive Processes; *Education Work Relationship; Experiential Learning; *Learning Experience; *Learning Processes; Learning Strategies; Learning Theories; Postsecondary Education; Secondary Education; Transfer of Training; *Work Experience
IDENTIFIERS *Work Based Learning

ABSTRACT

Experiential or work-based learning has been touted as imperative for the development of students and their preparation for the workplace. However, work-based learning does not always occur or occur to a significant extent merely because a student is in the workplace. What matters is the nature of the student's participation in workplace activities. Factors influencing the transfer of learning include the following: the knowledge environment of the workplace, how the knowledge is used, historical characteristics, the micropolitics of knowledge (who gets to know what, who controls access and how), and the learning process. Therefore, it is not enough to claim that a great deal of knowledge is present in the environment; educators need to track the learner's engagement in the use of that knowledge. (Contains 29 references) (KC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.
BEEN GRANTED BY
EPlaxman
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

INSTITUTE ON EDUCATION AND THE ECONOMY
IEE BRIEF
ISSN 1059 2776
Number 23/ January 1999

ED 428 263

TOWARD A THEORY OF WORK-BASED LEARNING

David Thornton Moore

When educational practitioners talk about school-to-work and work-based learning programs, they often seem to take for granted the meaning of the term *learning*. When a student engages in first-hand work experience in a real-world setting, it is assumed that people in the workplace pass their knowledge on to the newcomer. Sometimes the knowledge transmission happens through intentional instruction, sometimes through observation and imitation. Either way, the assumption goes, the student acquires knowledge used in the work environment. The relationship between experience and learning is generally regarded as unproblematic.

While practitioners tend to assume that experience plays a role in learning, most learning theorists focus on processes that go on inside heads. To the extent that experience appears in their theories, it plays the role of external stimulus or condition. If we want to test the claims made for work-based learning programs—claims about academic reinforcement, career exploration, and new modes of thought—we have to share a reasonably coherent notion of what we mean by learning and a reasonably clear conception of how it occurs in the course of experience.

An adequate theory of experiential learning should help us understand productive activity in real-world settings. I begin exploring that question by relating three narratives about students at work in specific situations. These stories come from two sources: my own ethnographic study of an experience-based high school in a large city (Moore 1981; 1986) and recent observations of other work-based learning participants by my colleagues at the Institute on Education and the Economy. The scenarios raise a fundamental question: where and how does learning appear as a component of these activities?

Case Studies

The State History Museum — Heather

The History Museum, which arranges exhibits around periods of history, offers educational tours to school groups, and our first student, Heather, worked as a volunteer tour guide. Tours have a general structure: guides first deliver introductory lectures explaining the basic purpose of the museum and laying out the agenda for the tour. After a short movie on, say, colonial households, they show visitors a series of handcrafted artifacts from the colonial period, and discuss how the tools were made and used. After a tour through a series of halls, pointing out specific materials and answering questions, the guides set up a drawing exercise for the children.

After spending several days watching veteran guides lead classes through the museum, Heather worked with small groups of children during the drawing exercise. One day, when the guide-supervisor had to attend to another group, Heather was called on to lead a brief and slightly awkward discussion of various household tools. Over the next couple of weeks, she was gradually inserted into each of the major slots of the tour: doing the opening lecture, leading the walk around the exhibit halls, setting up the drawing exercise, and so on. When she had performed each of those program elements a few times with the supervisor present, she was given a tour group on her own. By the end of the term, she was a full-fledged tour guide.

General Hospital, Physical Therapy Unit — Rob

The Physical Therapy Unit helps in-patients who have undergone some form of orthopedic surgery, or suffered strokes or heart attacks, recover the capacity to walk and otherwise function adequately. Rob worked as an assistant in this department. The supervisor consulted with physicians to determine the patients' underlying problems, devised a treatment program, and assigned other PTs and aides to carry out the plans. Patients were brought down to the PT Unit by volunteers, signed in, and put through the prescribed paces. Depending on the patient's condition, one or two aides would stand beside him and gently hold his arms as he walked the required steps. When the program was completed, the patient was taken back to his room.

Rob assisted the assistants, following behind patients to make sure they didn't fall, helping them in and out of wheelchairs, and preparing them to go back to their rooms. He also did clerical work and cleaned up after patients. His work was generally repetitious: greet the patient, help him through his program, and see him off. Most often he worked with another aide, but occasionally he followed patients by himself. He sometimes talked with the supervising PT about patients and their care; he overheard PTs telling each other stories about difficult patients or treatment foul-ups, but his work did not change significantly over the course of three observations.

Learning Designs, Inc. — Linda

Learning Designs, Inc., is a for-profit firm that creates learning programs and materials for school districts and corporations. One major project during our study was the production of a Life Skills curriculum for a big-city school district. Linda, a high school intern, functioned as an assistant to several of the editors on the Life Skills project. Pieces of the overall production were handled in sequence by different people. The chief editors sketched out the general structure and strategy of the project, and passed them along to a corps of writers and artists, who produced the text and graphics for each section. After revisions, the editors assigned assistants to proofread the work and get it ready for the printer.

Linda handled the lower-level odds and ends of the production process: photocopying, proofreading, and calculating the reading level of specific texts. She would go to one of several editors and ask what needed to be done; the editor would give her an assignment, show her what procedures to use, and leave her to her work. One day, for instance, Linda was asked to collate the pieces of a chapter on pollution: to find the tasks and texts that went together and put them in the correct order. The

CE 074 215
BEST COPY AVAILABLE

editor also asked her to read the activity cards and decide whether they made sense. Then she asked the intern to proofread a packet of new materials, and showed her the symbols for editing text. When Linda finished this chore, she spent the rest of the day photocopying documents for another editor.

Several questions can be posed about each of these stories:

- What kinds of knowledge were people using in these situations?
- How was that knowledge distributed and used?
- In what sense did learning happen? Who learned what?

These questions focus on the curriculum of experience, on the what and how of learning.

Alternative Theories

Several traditional approaches do not help us much with those issues:

Classical theories. Plato regarded education as the process of bringing forth knowledge already in the learner. He argued that sense experience is an illusion, an unreliable source of knowledge. Real knowledge is discovered, instead, through dialectic and reasoning. Similarly, Descartes rejected sense experience as a basis of reliable knowledge; he argued that the only path to truth was reason.

Empiricism and behaviorism. Starting with Locke, some philosophers maintained that the human mind at birth is a blank slate, and that all ideas emerge from experience and the associations it produces. Modern American behaviorists from Skinner (1965) to Watson (1998) built on this concept in their notion of learning as changes in behavior resulting from stimulus-response arcs. If a person responded to a stimulus in some way, and the consequences of that response were aversive, the behavior would be less likely to occur again, and vice versa. In this theory, which dominated American academic psychology for decades, the learner is seen as essentially passive, a blank slate on which external stimuli act.

Functionalism and cognitivism. In this school of thought, learning is regarded essentially as socialization or enculturation, the induction of the neophyte into a body of culturally defined knowledge, and the acquisition of functional forms of knowledge and skill by the learner (Durkheim 1915; Levy-Bruhl 1910/1966). The process is essentially passive: social mechanisms and persons teach the learner socially appropriate knowledge. The theory assumes that if you learn something in one context, you can import it into another. This mainstream perspective dominates both psychological theory and educational practice in American schools. Traditional schooling takes knowledge out of context, and treats it as generalizable, transferable and stable.

Developmentalism. This school of thought, exemplified in the work of Piaget (1967), Kohlberg (1981) and Belenky et al. (1997), defines knowledge as differently structured capacities to perform various cognitive, moral, or affective operations. Knowledge is organized into schemata, structured cognitive maps, rules or procedures for apprehending various domains such as space, time, or social relations. Learning, in this context, refers to the person's progression through successive stages of growth.

Foundations of experiential learning theory

Other schools of thought lead to more productive conceptions of learning.

Forebears. William James argued that one learns best through one's own activity; sensory experience is basic to learning; effective learning is holistic, interdisciplinary, and specific. John Dewey (1938) focused on experience as the key element in the educational process. He saw learning as the process of "making determinate the indeterminate experience," and argued that the proper procedure for doing that was the scientific method: a sequence of perceiving a problem, articulating it, forming a hypothesis for solving it, testing the hypothesis, and checking out the consequences of our actions in the world. That, he said, is where knowledge comes from. Moreover, Dewey suggested that the meaning of any experience is an interplay between what the person brings to the situation and what happens there. Based on knowledge derived from previous experience, that is, the person works on the new experience to make sense of it.

Mead (1934) situated that sense-making process squarely in the social context—in the interaction between the person and the social environment. Like James, Dewey, Mead, and Piaget, Bruner (1975) saw the learner as an active participant in the sense-making process, working on rather than simply responding to inputs from the outside world. Later, Bruner (1981) suggested the notion of scaffolding, the social and cognitive supports that a veteran affords to a neophyte in learning new practices; and he proposed that newcomers get inducted into frames, structured patterns of thinking, knowing and acting that are built into the routine practices of the social world.

Influential theories of thinking and learning. Vygotsky (1978), a Soviet psychologist of the 1930s, argued that thinking, learning and development have to be understood as embedded in—not simply related to or affected by—socio-historical activities and contexts. That is, a person's cognition is not only shaped by its social and historical context, but uses it as part of the process of thinking. Even more significantly, this interaction is mediated by certain culturally provided tools, including symbol systems like language, and machines like computers. Participating in the use of these tools, the person gradually becomes more capable of using them and comprehending their meaning in a wider range of contexts. To Vygotsky and his followers, there is no learning or development without engagement with these tools.

Some of Vygotsky's students developed a school of thought called *activity theory* (cf. Leont'ev 1979). An activity is a functionally organized and culturally meaningful unit of behavior, a sequence of actions structured by participants around shared goals and rules. The museum tour is such an activity; the treatment of a patient in the physical therapy unit is another. While activities are clearly constructed by participants, they take on a meaning and social existence of their own as well. New members build understanding through their participation in them.

The work of Cole and his col-

leagues spawned a number of studies in cross-cultural psychology, all of which concluded that cognition must be understood as embedded in specific social and cultural contexts (Cole & Means 1986; Cole, Hood & McDermott 1978). One version of that argument was developed by Scribner (1986), who studied what she called working intelligence, the capacity for thinking and problem-solving in such everyday situations as the workplace. Lave (1988), drawing on studies of apprentice tailors in Liberia, grocery shoppers, and members of Weight Watchers, showed how thinking is embedded in the relations between the thinking person, the activity in which she is engaged, and the context in which that activity appears. This theory of *situated cognition* places thought processes, which may be individual or shared, squarely in the social world.

Resnick drew distinctions between thinking practices in school settings and those in the everyday world: individual cognition in school vs. shared cognition outside; pure mentation in school vs. tool manipulation outside; and generalized learning in school vs. situation-specific competencies outside (Resnick 1987). Brown and his colleagues wrote that, "The activity in which knowledge is developed and deployed . . . is an integral part of what is learned" (Brown et al. 1989: p. 32).

Another key element of my conception of work-based learning goes variously by the terms *socially shared cognition* (Resnick et al. 1991) and *distributed cognition* (Salomon 1993). This school of thought maintains that a cognitive activity is not only situated but shared; the activity is carried out not by a single individual but by a complex system of persons, tools, and symbols.

Theories of organizational culture. Another important strand of theory is the notion of organizational culture. Goodenough (1957) defined culture as the knowledge one needs to participate competently in the roles and activities of a social system. It is the sharing and use of this sociocultural knowledge that makes interaction—and learning— possible in specific situations. Martin (1992: p.3) included these elements of organizational culture: "dress norms, the stories people tell about what goes on, the organization's formal rules and procedures, its informal codes of behavior, rituals, tasks, pay systems, jargon, jokes understood only by insiders, and so on."

A conception of work-based learning

In analyzing what occurs when students are engaged in workplace learning, we should avoid simplistic claims that students learn merely by virtue of being in these settings. The fact that a student spends time in a knowledge-rich environment does not necessarily suggest that she acquires that knowledge. What matters is the nature of her participation in workplace activities.

A definition of learning. I use the term *learning* to refer to an activity system's construction, reorganization or transformation of knowledge-use. The activity system might be an individual person, an organized group of people, or a community of practice (e.g., the tour guides in the museum). Each of these system levels uses knowledge in the course of an activity. I use the term *knowledge* to refer to the facts, theories, procedural and social skills, strategies, styles, worldviews, and values of the workplace—the kind of "stuff" one knows at work. Some people think of knowledge as a possession; others define it as an activity. I straddle the fence and treat knowledge the way a physicist treats energy: as having two complementary states, one potential and the other kinetic. Although knowledge does not disappear between occasions of its use, the most significant state of knowledge is its use in practice, its contribution to the way people make sense of and participate in activities.

Bloom's classic taxonomy (1956) offers another approach to exploring the use of knowledge in work contexts. He proposed that curriculum designers aim at promoting six different levels of cognitive activity: *knowledge, comprehension, application, analysis, synthesis,* and *evaluation.* We can use this taxonomy to examine the level of cognitive work the interns are asked to do: Heather has to synthesize an age-appropriate narrative of colonial family life, while Rob merely has to know how to put a patient in a wheelchair. We can also characterize the whole activity system—not just the work of the individual student—in these terms. Finally, we can find individuals and groups performing "executive functions" (Perkins, 1993), making nonroutine choices directing and managing cognitive activity.

The crucial issue for evaluating the experiences of students in work-based learning programs, then, becomes the examination of the way they encounter various kinds of knowledge as they take part in workplace activities. The issue is not what knowledge is in the environment, but what knowledge the students engage over time.

An analytic strategy. Since, as our theorists have proposed, cognition and learning are processes entailed in activity and context in the social world, our initial focus of attention should be not the single individual, but the environment in which she finds herself. We need to understand how participants in the context define, distribute and use knowledge, and how their participation is mediated by culturally defined tools. That is, we need to understand the community of practice. Then we need to examine the way knowledge-use is enlarged, reorganized or transformed.

The knowledge environment. The first step in describing the knowledge environment is to discover the *content* of the knowledge available. The description will then *locate* the knowledge in heads, in books and tools, and in social relations and practices. And it will show how the knowledge is *used.*

An inventory of the knowledge used in the museum, for instance, would include facts about the history of the city and the state, theories about those facts, and value judgments about them—for example, the impact of a new canal on community life. Another form of knowledge in the museum would include procedural and social skills. These skills could be grouped into more general strategies, including the format for the whole tour and for working out plans with the teachers. Similarly, skills in the PT gym would include helping patients up and down the stairs as well as treating them cordially and respectfully. One could also describe the content of work-based learning in those terms. Tour guides shared a general conception of "how we do things around here," of

what styles of behavior to use in which situations; they knew the implicit rules for dress, speech and relationships. The cultures of the PT program and the curriculum firm had their own details.

One can move on to look at how that knowledge is used. Drawing on Bloom's taxonomy, for instance, one sees several kinds of knowledge-use activities. To respond to questions about the artifacts, Heather had to *synthesize* a general portrait of colonial household life, using information and ideas taken from a number of sources. In contrast, Rob had to *know* and *apply* the elements of patient treatment but not to *comprehend* the underlying science. Similarly, Linda's work did not ask for comprehension or analysis but only for the application of a readability formula.

Historical characteristics. The history of the environment affects whether and how the newcomer gets access to particular kinds of knowledge. How did the knowledge-use system come to operate the way it does? In the case of the history museum, the museum's own history shaped some of the knowledge-in-use in the tours. Tension between the elitist impulses of the wealthy citizens who founded the institution and the more democratic interests of the general populace of the city and state shaped conceptions of what counts as important history. As funding from public sources became more crucial, the institution created programs (e.g., tours) that would broaden its audience. The fact that the elementary-school tours were designed partly to generate future support shaped, to some extent, the nature of the knowledge the guides used.

Rob's work in the physical therapy unit in General Hospital was also shaped by historical developments. Hospitals began as service institutions and grew into increasingly compartmentalized and professionalized operations. Physical therapy evolved as a health-care profession, both in its medical-technical aspects and in its political and status relation to the medical profession. What happens in PT units emerges from these complex historical processes. Likewise, the analysis of knowledge-use in the curriculum firm has to take into account the recent commercialization of school curricula, and the intense competition that has arisen among private firms. This atmosphere clearly shaped the sorts of knowledge Linda encountered.

Location and access. In a more immediate sense, an analysis of situated learning also must attend to the social organization of knowledge-use: where knowledge is located, who participates in its use, and how they get access to such participation. Content knowledge about state history, for example, was located in many places in the museum: in the library and exhibits; in the heads of curators, tour guides, and even visitors. In the PT unit, technical knowledge about patient care was located in practitioners' heads and in their activities, and embedded in the therapeutic devices: the stairs, the bars, the walkers, and the whirlpools.

The various settings distributed knowledge in different ways. In the museum, most of the educational services were provided by the volunteer guides, including the interns. Moreover, the nature of the work itself required that every tour guide have a broad repertoire of knowledge and skills, that they be able to work with a variety of groups around a variety of historical themes. Although much of the cognitive work was off-loaded onto the exhibits and the artifacts, guides had to know how to interpret and use them. In the PT unit, on the other hand, most technical knowledge was located in the lead therapist and in the tools; the assistants (like Rob) did not need to grasp the underlying theories to be useful.

Two concepts proposed by Bernstein (1975) help us describe these features of the setting. *Classification* is the degree to which content domains are kept separate from each other; where classification is strong, contents are insulated from each other by strong boundaries. *Frame* is the degree of control teacher and pupil possess over the selection, organization, pacing and timing of the knowledge transmitted and received.

In the museum tour, classification was weak: topics intersected each other in an improvised and unpredictable way. Frame was weak, too: the director of the education department did not exercise control over the knowledge that could be used by the guides; nor did the guides exclusively control the knowledge used in any specific tour. By contrast, the distribution of knowledge in the curriculum firm was highly segmented: classification and frame were both strong. Functions were specialized: writers only wrote, and artists only produced graphics. Project managers designed the work and controlled the range of knowledge used by the underlings. Writers were told what to write, artists what to draw. Interns followed clear instructions. Knowledge fell into distinct categories; communication across those classifications was solely for coordination.

These features of the learning environment are the *micropolitics of knowledge:* who gets to know what, who controls that access and how. A key element of the analysis of learning in the workplace is the degree to which and the means by which various forms of knowledge in the environment are actually accessible to particular members. Different knowledge-use systems vary tremendously on these dimensions; that is what makes some of them effective learning environments and others not. The notion of access is complex. People do not simply get access or not get it. In the broadest sense, knowledge is *present* in the environment when it is manifested and displayed. It is *available* to a person (or a group) only when it is utilized or displayed in a context in which the agent participates. And knowledge is *engaged* only when the person attends to it, utilizes it to perform some action, displays it or otherwise operates on it.

The critical issue for the educator, then, is the extent to which various actors in the organization participate in the use of various kinds of knowledge, and how that access is organized and effected. The fact that a particular item or even system of knowledge is present does not mean that it will be available to any particular person in the course of everyday interactions. Moreover, the fact that it is available in the contexts in which the person takes part does not necessarily mean that she will engage it in any significant way. The important point is that the nature of the learning

process depends on the extent to which the newcomer wants, is expected, and has the opportunity to engage various forms of knowledge-use. The learning analyst needs to determine which knowledge is demanded of the intern, which is only encouraged or appreciated, and which is merely tolerated. These differences are subtle, but have important educational effects.

The learning process. Once we have discovered the general knowledge characteristics of an activity system according to this framework, we can focus on how learning occurs. Learning may be done by individuals, by groups and by the organization as a whole. Although educators focus primarily on individual students, they need to understand that the individual's educational experience will vary depending on whether knowledge is stable and authoritative, passed on whole-cloth to newcomers, or growing in content and shifting in distribution.

The museum education department, conceived as a community of practice, enlarged and reorganized its knowledge-use all the time. Exhibit curators spoke with the volunteer guides about the design of new displays, giving them ideas about how to present the new concepts to school children. In meetings with teachers, the guides often gained insights into the way kids understand history and the kinds of teaching tactics that help them. When new books were acquired by the department library, guides discussed them in informal sessions in the office.

The PT program and the curriculum firm also learned a great deal as activity systems. The physicians who referred patients to the therapists often had new ideas about diagnosis and treatment. The chief physical therapist adjusted the team's practices to the state of the art. Similarly, the project managers in LDI had to stay at the cutting edge of curriculum and pedagogy. Clearly, knowledge-use in these organizations grew and reorganized in many ways. But because of the particular *access characteristics* of that knowledge (Perkins, 1993), the high school students did not engage much of it.

The learning analyst should look at how individual students participate in various kinds of activity, and are involved with different kinds of knowledge. Heather fully engaged several forms of knowledge: about the artifacts as historical objects, about public speaking, and about controlling children's behavior. She exercised an executive function as the tour progressed, adjusting the content and pace of her presentation in response to changing conditions. When Rob helped a patient walk across the floor, he learned something about physical disability, about human interaction, and about therapeutic devices and procedures. But he did not participate in knowledge about underlying physiological conditions or processes, or rehabilitative strategies; nor did he perform an executive function, since his supervisor told him what needed to be done from moment to moment. In her sporadic exposure to the curriculum materials, Linda had little engagement with knowledge about curriculum development or learning theory, about market forces in the publishing industry, or about the skill of client negotiations.

Over the course of a semester's internship, Heather's gradual insertion into the full scope of tour activities represented a powerful example of the scaffolding process: supports were slowly taken away as she demonstrated an increasing capacity to handle the various components. The trajectory of Heather's learning moved steadily upward. By the end of the term, she was a full-fledged member of the community of tour guides. She not only observed knowledge-in-use, she participated in it. She was fully responsible for displaying the knowledge tour guides had to use; and the social organization of that knowledge gave her full access to it. She knew how to share cognitive work effectively: when to ask for tips from the director or her colleagues; where to find information in the library or the exhibits; how to call on the classroom teacher for help in working with the children. The museum experience proved to be powerfully educational.

Learning in the physical therapy unit took a different shape. Rob played a recognized and valuable role in the work of the organization, but his access to and engagement in important forms of knowledge-use were limited. With no occasion to engage the complex knowledge that informed practices in the unit, his work consisted primarily of backing up other aides. The forms of knowledge that Rob had to display were useful, but not central, to the activity.

Although Rob spoke with the unit director about patients and their treatment, these conversations were brief and simplistic, focused more on the characteristics of specific patients than on the intellectual foundations of physical therapy. By his fourth day, Rob had already mastered the skills that would constitute the bulk of his work for the rest of the term. His learning trajectory was flat. He knew rudimentary treatment techniques, but not the conditions or theories behind them. He had opportunities to collaborate with other members of the PT staff, and thus came to understand something about teamwork and authority. He also observed unusual treatments, but in the absence of deeper background these episodes were more intriguing than educational. Rob did ask several people about their training as physical therapists, about their schools, about their career paths, and these discussions no doubt informed his own career planning process. The experience certainly engaged Rob in some significant learning activities; but it did not get him very far into the community of practice.

Linda's experience in Learning Designs, Inc. was even less productive than Rob's. A great deal of complex knowledge was in use in the activity system: content areas like consumer rights and public safety; intellectual operations like curriculum development; and background issues like child development and learning theory. But by the time the cognitive work was distributed, little of that knowledge was accessible to Linda. Supervisors could not afford the time to explain their actions and decisions to low-level personnel. Rather, they needed support tasks done, and assigned these workers to them without giving them the bigger picture.

Occasionally, Linda was assigned tasks that demanded a deeper understanding of the work and the product. While those chores might have given

Institute on Education and the Economy
Box 174, Teachers College, Columbia University
New York, New York 10027
212-678-3091 Fax: (212) 678-3699
iee@columbia.edu
http://www.tc.columbia.edu/~iee
Director: Thomas R. Bailey
Managing Editor: Lisa Rothman

her editors a chance to fill Linda in on the broader nature of the project, they gave her only the most elementary instructions. Over the term of the internship, Linda's learning trajectory was either flat or negative. Her tasks at the end were essentially the same as her tasks at the beginning. She took no initiative, was held accountable for nothing important, and did not even get to watch editorial meetings. Interactions with her supervising editors were sporadic, rushed and highly task-oriented; they rarely gave her a broad sense of what the team was doing. Like Rob, Linda functioned as a legitimate peripheral participant (Lave and Wenger, 1991), but her participation was even more peripheral than his, being limited to what might be called odds and ends or finishing touches.

Concluding remarks

These case studies illustrate the utility of the proposed analytic framework. A student's work-based learning always depends on the complex interaction between the person and the activity system in which she participates. It is not enough to claim that a great deal of knowledge is present in the environment. Educators need to track the learner's engagement in the use of that knowledge. All three of the workplaces we examined contained rich knowledge systems. Given appropriate pedagogical strategies in school, students could learn a lot about them all. But our focus was on what kinds of learning the newcomer can do in the workplace—and on that dimension the three experiences were quite different in quality. Reducing Dewey's theory to "learning by doing" or Lave's to "legitimate peripheral participation" misses too much of the subtle interaction and leads to gross generalities. But using the concepts sketched out in this Brief can yield a nuanced analysis of the learning process in a given workplace.

When an intern enters a workplace, she brings with her certain experiences, ways of thinking, predispositions, habits and interpretive frameworks. The workplace has its own historically developed features: cultural patterns, tools and symbol systems, and social relations. As the participants engage in work activity, they collaborate in interpreting the situation, using tools and thinking about what is going on and what needs to be done. The newcomer tries to make sense of what's going on based on her previous experience and on the current distribution of cognitive and other work; people and tools mediate her participation, affording her access to the stock of knowledge in use in the activity system. She learns in the sense and to the extent that her participation in this community of practice changes over time; she takes part in the use of more (in quantity, complexity, and importance) situated knowledge. Finally, the activity system itself learns, in the sense that it constructs, organizes, distributes and uses more and different knowledge in the course of the activity. That is what work-based learning can look like.

This Brief was developed at the Institute on Education and the Economy, Teachers College, Columbia University. It was drawn from a paper that will become part of a book on work-based learning, which is currently being compiled by IEE staff. The research for this paper was conducted with support from the Pew Charitable Trusts and the DeWitt Wallace—Reader's Digest Fund.

REFERENCES

Belenky, M. F., Clinchy, B. McV., Rule, N., & Tarule, J.M. (1997). *Women's ways of knowing.* NY: Basic Books.

Bernstein, B. (1975). *Class, codes, and control: Volume 3: Towards a theory of educational transmission.* London: Routledge and Kegan Paul.

Bloom, B. (1956). *Taxonomy of educational objectives: The classification of educational goals. Handbook 1: The cognitive domain.* NY: Longman.

Brown, J.S., Collins, S., & Duguid, P. (1989, January-February). Situated cognition and the culture of learning. *Educational Researcher* 18, 32-42.

Bruner, J. (1975). *Beyond the information given.* NY: Basic Books.

Bruner, J. (1981). The social context of language acquisition. *Language and Communication* 1(2/3), 155-178.

Cole, M., Hood, L., & McDermott, R.P. (1978). *Ecological niche-picking: Ecological invalidity as an axiom of experimental cognitive psychology.* NY: Rockefeller University.

Cole, M., & Means, B. (1986). *Comparative studies of how people think.* Cambridge, MA: Harvard University Press.

Dewey, J. (1938). *Experience and education.* New York: Collier.

Durkheim, E. (1915). *The elementary forms of religious life.* NY: The Free Press.

Goodenough, W. (1957). Cultural anthropology and linguistics. In P.L. Gavin (Ed.), *Report on the 7th annual roundtable meetings on linguistics and language study* (pp. 167-173). Georgetown University Monograph Series on Language and Linguistics, Vol. 9. Washington, DC: Georgetown University.

Kohlberg, L. (1981). *The meaning and measurement of moral development.* Worcester, MA: Clark University Heinz Werner Institute.

Lave, J. (1988). *Cognition in practice.* NY: Cambridge University Press.

Lave, J. and Wenger, E. (1991). *Situated learning.* New York: Cambridge University Press.

Leont'ev, A.N. (1979). The problem of activity in psychology. In J.V. Wertsch (Ed.), *The concept of activity in Soviet psychology.* Armonk, NY: Sharpe.

Levy-Bruhl, L. (1910/1966). *How natives think.* NY: Washington Square Press.

Martin, J. (1992). *Cultures in organizations: Three perspectives.* NY: Oxford University Press.

Mead, G.H. (1934). *Mind, self, and society.* Chicago: University of Chicago Press.

Moore, D.T. (1981). Discovering the pedagogy of experience. *Harvard Educational Review* 51(2), 286-300.

Moore, D.T. (1986). Knowledge at work: An approach to learning by interns. In K. Borsman & J. Reisman (Eds.), *Becoming a worker.* Norwood, NJ: Ablex Publishing.

Perkins, D.N. (1993). Person-plus: A distributed view of thinking and learning. In G. Salomon (Ed.), *Distributed cognitions: Psychological and educational considerations.* New York: Cambridge University Press.

Piaget, J. (1967). *Six psychological studies.* NY: Random House.

Resnick, L. (1987). Learning in school and out. *Educational Researcher* 16(9):13-20.

Resnick, L., Levine, J.M., & Teasley, S.D. (Eds.) (1991). *Perspectives on socially shared cognition.* Washington, DC: American Psychological Association.

Salomon, G. (Ed.) (1993). *Distributed cognitions: Psychological and educational considerations.* NY: Cambridge University Press.

Scribner, S. (1986). Thinking in action: Some characteristics of practical thought. In R.J. Sternberg & R.K. Wagner (Eds.), *Nature and origins of competence in the everyday world.* NY: Cambridge University Press.

Skinner, B.F. (1965). *Science and human behavior.* NY: The Free Press.

Vygotsky, L.S. (1978). *Mind in society.* (M. Cole, transl.) Cambridge, MA: Harvard University Press.

Watson, J.B. (1998). *Behaviorism.* NY: Transaction Publications.